



# dLAN<sup>®</sup> 200 AVpro WP



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# Preface

## Thank you for placing your trust in this devolo product.

devolo dLAN business solutions are a favourably priced option for using the power grid infrastructure in a building to establish a broadband IP network. The advantage this brings is obvious: no new cables have to be laid – expenditure and costs remain low. The new dLAN 200 AVpro WP, based on the HomePlug AV standard, transmits data, voice and video over the power line at rates up to 200 Mbps. Furthermore, the dLAN 200 AVpro WP has an integrated electrical socket for connection of end devices or power strips. The integrated mains filter optimises the transmission capacity of the dLAN network.

## About this manual

In addition to an introduction in the fundamentals of the "dLAN" topic as well as illustrations of examples of networking given in **Chapter 1**, in **Chapter 2** you learn how you successfully set up your dLAN 200 AVpro WP and configure your dLAN network. **Chapter 3** contains safety notes, statements upon conformity and environmental compatibility as well as our warranty terms.

You can find the technical data on the dLAN 200 AVpro WP in the **product sheet** on the enclosed CD.

## Icons

This section contains a brief description of the icons used in this manual.

*Very important note. Failure to observe this note may result in damage.*



*Important note that should be observed.*



*Additional information, background material and configuration tips for your device.*

And if you are satisfied with your dLAN 200 AVpro WP, be sure to have a closer look at our other products which are also designed to make your connected lifestyle easier and simpler! If you have any further ideas or suggestions related to our products, we would be delighted to hear from you at [support@devolo.com](mailto:support@devolo.com)!

## devolo on the Internet

For detailed information on our products, visit [www.devolo.com](http://www.devolo.com). The download area not only contains product descriptions and documentation, but also updates of devolo software and your device's firmware.

# 1 Introduction

In this chapter we provide you with an overview of dLAN technology and briefly present the dLAN 200 AVpro WP adapter. Furthermore, at the end of the chapter you can find some illustrations showing examples of networking.

## 1.1 What exactly is dLAN?

There is now an exciting new alternative to the familiar cable-based and wireless technologies, LAN and Wireless LAN: **dLAN** (direct Local Area Network, i.e. networked directly). dLAN uses power cables that have already been installed to enable data communication.

### Cost factor and transmission quality

dLAN is an economical and easy-to-use networking technology. Cables no longer need to be installed, and any socket outlet can be used to connect to the network.

With dLAN, additional frequencies are modulated on the power circuits. Modulation and demodulation is a well-known and proven method of data transmission, which has been in use in other applications for a number of years. Depending on the properties of the circuit and the damping factor, distances of up to 200 meters can be spanned with the power circuit.

The standard **HomePlug AV** is used for transmission of data over the power supply grid with the dLAN 200 AVpro WP. HomePlug AV uses the domestic power infrastructure to transmit data, audio and video in just the same way as the proven HomePlug 1.0 technology. But HomePlug AV is much faster: with a transmission rate of 200 Mbps and its "Quality of Service" functions (QoS), HomePlug AV technology is ideal for Triple-Play services, and is thus entirely capable of handling the enormous range of new online entertainment options.

*HomePlug AV adapters and HomePlug 1.0 devices can be operated together in the same power grid. Though data can not be transmitted between these two HomePlug standards.*

### Data security and radiation

dLAN 200 AVpro WP devices are secured via "AESpro 128". This is a combination of "128-bit triple AES encryption" (Advanced Encryption Standard) and a time lock when entering a new password. This procedure represents reliable pro-



tection for your dLAN network against unauthorised access. Two attack methods would be possible, but AESpro security ensures they can not be successful:

- ❶ A "brute force" attack could be started as one way to find the suitable key for decrypting the data. In such an attack, all possible letter and number combinations in the chip are tested one after the other. But given the huge number of key combinations and a maximum transmission rate between the PC and the chip of 100 Mbps (Ethernet port), a brute force attack of this kind would require an average of 45.000 years in order to succeed.
- ❷ Another type of attack would be to intercept encrypted raw data. Based on the raw data, it might be possible to obtain certain clues regarding the key, and thus to gain access to the raw data. However, with dLAN technology, the encrypted raw data cannot be intercepted from the power circuit, because the chip does not forward encrypted data directly to the network interface. In the chip, the signal is both encrypted and modulated directly, so an attacker would only be able to gain access to the modulated data. However, this is useless to him, because he has no way to back-modulate the signal.

### **Conformity and environmental compatibility**

dLAN devices made by devolo fulfil the strict EU industrial standards and comply with the current standards for electromagnetic radiation. You can find further information on CE conformity and environmental compatibility in the appendix to this manual.

## 1.2 What does the dLAN 200 AVpro WP offer you?

### Powerful and flexible

The dLAN 200 AVpro WP delivers a maximum transmission speed of 200 Mbps which makes it ideal for the high demands placed by applications such as HDTV streaming, internet telephony and fast internet.

Usage of the dLAN 200 AVpro WP provides the following applications and advantages in detail:

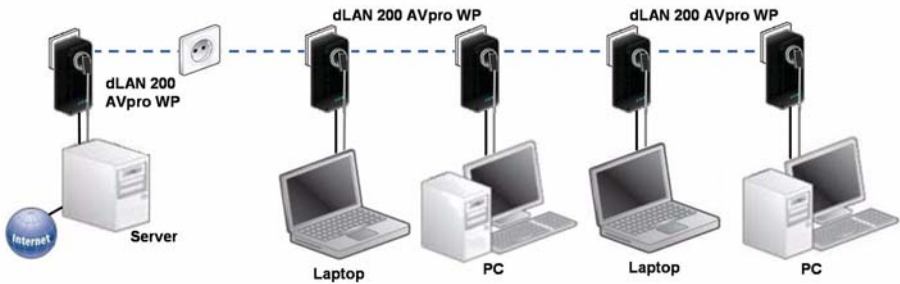
- Integrated electrical socket for connection of power strips and end devices
- Integrated mains filter for reduction of interference on the dLAN network
- Remote management via the dLAN 200 AVpro manager management software
- Integrated Quality-of-Service functions (QoS) for automatic data prioritisation
- Quality indicator LED for determining broadband status
- 1 Ethernet port with Auto MDI/X
- Master/slave or peer-to-peer architecture
- Segments possible with up to 63 slaves per master
- Data transmission with a range up to 200 metres in the power grid
- Powerful 128-bit AES security for securing data transmission against unauthorised access
- Further extensive configuration options (notching, output power etc.)



## 1.3 All about the network

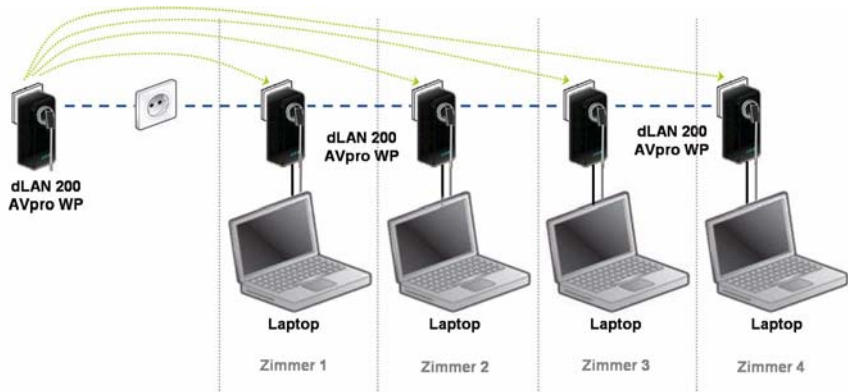
### 1.3.1 Peer-to-peer networking and internet access

You use dLAN 200 AVpro WP adapters to network devices such as computers, routers, switches, IP telephones, set-top boxes etc. over the existing power lines. In such a mode, called "peer-to-peer", all dLAN 200 AVpro WP adapters installed in the network can freely exchange data with each other. All networked devices can use a centralised internet access over the dLAN 200 AVpro WP.



### 1.3.2 Peer isolation networking

Depending upon the application scenario, security considerations may mean that it is to be forbidden for all devices to exchange data freely with each other. For this purpose, a mode can be activated that realises a real "peer isolation" (establishment of a master/slave hierarchy); all dLAN 200 AVpro WP adapters configured as slaves can **not** exchange data with each other, only with the master.



*For detailed descriptions and information on configuration of your dLAN network please consult the **devolo dLAN 200 AVpro manager manual** (see Chapter 2.5.1 'Installation of devolo software').*

## 2 Initial use

This chapter covers everything you need to know to set up your dLAN 200 AVpro WP. It will explain connecting the dLAN 200 AVpro WP and its functions. We will also introduce the included devolo software.

### 2.1 Package contents

Please ensure that the delivery is complete before beginning with the installation of your dLAN 200 AVpro WP. The following components are included in the scope of delivery:

- dLAN 200 AVpro WP
- Network cable
- CD containing software and online documentation

devolo AG reserves the right to change the package contents without prior notice.

### 2.2 System requirements

- **Operating systems:** Windows XP (32 bit), Windows Vista (32/64 bit), Linux, Mac OS X and any other operating system with network support
- **Network connection**



*Please note that HomePlug AV adapters and HomePlug 1.0 devices can be operated together in the same power grid. Although data can not be transmitted between these two HomePlug standards. More **valuable information about dLAN 200 AV** is available in the **Service & Support** section of our website at [www.devolo.com](http://www.devolo.com).*

## 2.3 Functions

The dLAN 200 AVpro WP has three control lamps (LEDs). The device is also equipped with an integrated electrical socket and a network jack.



Illustration is country-specific.

### 2.3.1 Control lamps (LEDs)



<b>Power</b>	green	Lights up when the dLAN 200 AVpro WP is ready to operate; flashes when the dLAN 200 AVpro WP is in standby mode.
<b>dLAN</b>	green	The network connection is suitable for HD video streaming; flashes when data is being transmitted.
	orange	The network connection is suitable for SD video streaming and online gaming; flashes when data is being transmitted.
	red	The network connection is suitable for simple data transfer and Internet access; flashes when data is being transmitted.
<b>Ethernet</b>	green	A 100 Mbps or 10 Mbps connection to the Ethernet network exists; flashes when data is being transmitted.

## 2.3.2

### Ports

- **Network connection:**  
This is the connection point on the dLAN 200 AVpro WP for connecting it to a computer or another network device with the network cable.
- **Integrated electrical socket**  
If you connect additional network devices using a multiple socket, plug this multiple socket into the electrical socket of the dLAN 200 AVpro WP. The integrated mains filter eliminates any noise of connected devices and significantly improves data transmission in the network.

## 2.4

### Connecting the dLAN 200 AVpro WP

This section describes how to connect your dLAN 200 AVpro WP to a computer or to a network.

- ① Use the included network cable to connect the dLAN 200 AVpro WP to the network port of your running computer or other network device.
- ② Plug the dLAN 200 AVpro WP into a wall socket.
- ③ Additional network devices that are connected via a multiple socket are connected to the mains power supply by plugging the multiple socket into the integrated electrical socket of the dLAN 200 AVpro WP.
- ④ Once you have connected at least two dLAN 200 AVpro WP adapters as described in ① and ②, your dLAN 200 AVpro WP network has been set up. To protect your dLAN network **individually** from unauthorised access, you should first write down the **security IDs** of the dLAN devices. This unique identifier of each dLAN device is located on the label on the housing. Then continue with installation of the devolo software.

## 2.5

### Installation of devolo software

### 2.5.1

#### devolo dLAN 200 AVpro manager for Windows

The installation wizard installs the **devolo dLAN 200 AVpro manager** configuration software as well as the **associated manual** on the Windows operating system.

- **devolo dLAN 200 AVpro manager** encrypts your dLAN network individually and thus secures it against unauthorised access.

To install the software, insert the included CD-ROM in the CD drive of your computer. During the installation process, you will be given the choice of installing all software components ('Standard installation') or selecting individual ones ('Custom installation'). After installation is complete you will find the installed **devolo dLAN 200 AVpro manager** as well as the **associated manual** in the program group **Start ► All Programs ► devolo**.



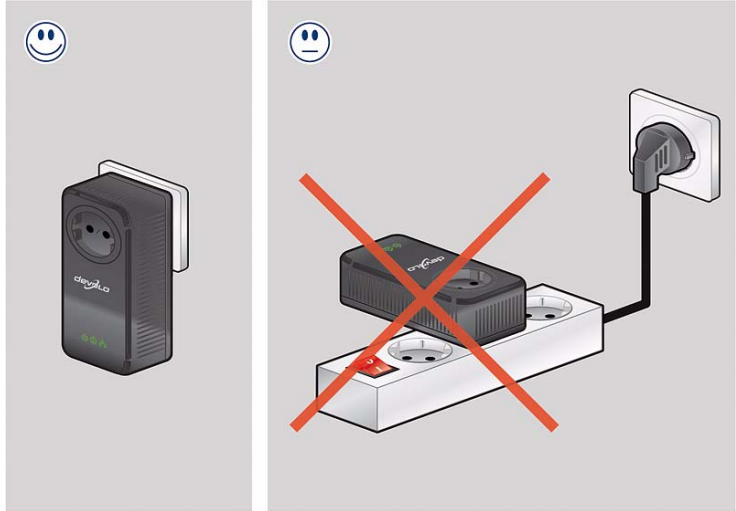
*For detailed descriptions and information on configuration of your dLAN network please consult this **devolo dLAN 200 AVpro manager manual**.*

## 3 Appendix

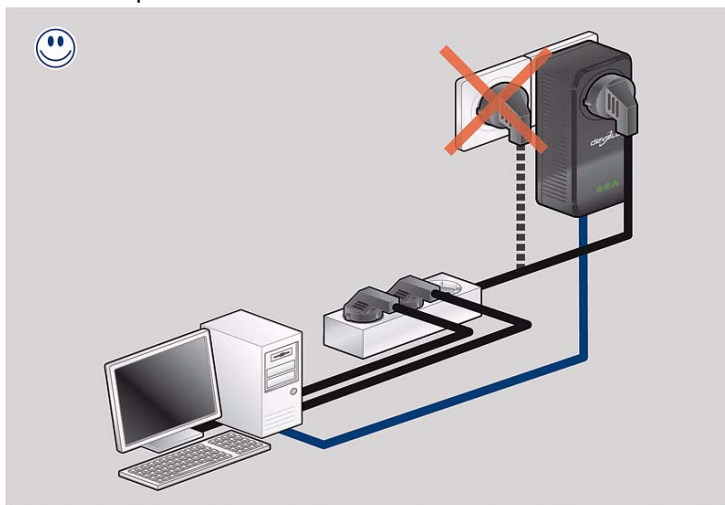
### 3.1 Bandwidth optimisation

To significantly improve the transmission capacity of the network, we recommend that you comply with the following "connection rules":

Plug the device **directly** into a **wall socket**. Avoid multiple sockets.



You should connect all additional network devices that are connected to a multiple socket to the mains power supply via the electrical socket integrated into the dLAN 200 AVpro WP. To take full advantage of the **filter function** of the dLAN 200 AVpro WP and to improve data transmission in the network, **always** plug the **multiple socket** into the **electrical socket** of the dLAN 200 AVpro WP.



*If you need to power more devices, use a remote wall socket.*



## 3.2

### Important safety instructions

All safety and operating instructions should be read and understood before using the device, and should be kept for future reference.



- Never open the device. There are no user-serviceable parts inside the device.

*Do not try to service this product yourself! Contact qualified technicians each and every time your device needs maintenance. There is a risk of electric shock!*

- Use the device in a dry location only.
- Always use the included network cable to connect the device.
- Do not insert any objects into the openings of the device.
- To disconnect the device from the power supply grid, pull the power plug.
- Do not keep the device in direct sunlight.
- Slots and openings on the case serve as ventilation. Never block or cover them.
- Never set up the device near a heater or radiator.
- The device should be located only where sufficient ventilation can be ensured.
- Disconnect the device from the power supply grid before cleaning. Use a moist towel to clean the device. Never use water, paint thinner, benzene, alcohol or other strong cleaning agents when cleaning the device, as these could damage the case.
- Never use the device with a power supply that does not meet the specifications provided on the rating plate. If you do not know what type of power supply you have at home, contact your dealer or energy supplier.
- In the event of damage, disconnect the device from the power supply grid and contact customer service. This applies, for example, if
  - the power cable or plug is damaged.
  - liquid has been spilled on the device or objects have fallen into the device.
  - the device has been exposed to rain or water.
  - the device does not work, even though the operating instructions have been followed properly.
  - the device's case is damaged.

### 3.3 Disposal of scrap equipment



The symbol of the crossed-out wheeled bin on the dLAN 200 AVpro WP indicates that it falls into the scope of the German Electrical and Electronic Equipment Act ("Elektrogesetz"). Since 24 March 2006, such products may not be disposed of as domestic waste. Instead, you can return waste electrical or electronic equipment free of charge at the nearest municipal collection point. Please inquire at your city's or municipality's administration for the address and the opening hours of a collection point in your district.

### 3.4 Technical specifications

For **technical specifications** of the dLAN 200 AVpro WP, please see our **product sheet** on the included product CD.

## 3.5

## Declaration of conformity



## KONFORMITÄTSERKLÄRUNG

DECLARATION OF CONFORMITY

Hersteller: **devolo AG**  
Manufacturer: **Sonnenweg 11**  
**52070 Aachen**

Produkt: **devolo dLAN 200 AVpro WP**  
Product:

Typnummer: **MT 2169, 2170, 2192**  
Type number:

Verwendungszweck: **PLC zu Ethernet Adapter**  
Intended purpose: **PLC to Ethernet Adapter**

Richtlinie: **EMV 2004/108/EG**  
Directive: **EMC 2004/108/EC**

Das Produkt entspricht den grundlegenden Anforderungen und Bestimmungen der folgenden Normen und Methoden:

The product complies with the essential requirements and provisions of following standards and methods:

Sicherheitsanforderungen: **EN 60950-1:2006**  
Safety requirements:

Immunitätsanforderungen: **EN 50412-2-1**  
Immunity requirements:

Emissionsanforderungen gestrahlt: **EN 55022:2006**  
Emission requirements radiated:

Emissionsanforderungen leitungsgebunden: **TCF vom Notified Body**  
Emission requirements conducted: **TCF from Notified Body**

Diese Erklärung wird verantwortlich abgegeben durch:  
This declaration is submitted by:

Aachen, 12. Dezember 2008  
Aachen, 12<sup>th</sup> December 2008

Heiko Harbers  
Vorstandsvorsitzender  
CEO

## 3.6 Warranty conditions

The devolo AG warranty is given to purchasers of devolo products in addition to the warranty conditions provided by law and in accordance with the following conditions:

### 1 Warranty coverage

- a) The warranty covers the equipment delivered and all its parts. Parts will, at devolo's sole discretion, be replaced or repaired free of charge if, despite proven proper handling and adherence to the operating instructions, these parts became defective due to fabrication and/or material defects. Alternatively, devolo reserves the right to replace the defective product with a comparable product with the same specifications and features. Operating manuals and possibly supplied software are excluded from the warranty.
- b) Material and service charges shall be covered by devolo, but not shipping and handling costs involved in transport from the buyer to the service station and/or to devolo.
- c) Replaced parts become property of devolo.
- d) devolo is authorized to carry out technical changes (e.g. firmware updates) beyond repair and replacement of defective parts in order to bring the equipment up to the current technical state. This does not result in any additional charge for the customer. A legal claim to this service does not exist.

### 2 Warranty period

The warranty period for this devolo product is three years. This period begins at the day of delivery from the devolo dealer. Warranty services carried out by devolo do not result in an extension of the warranty period nor do they initiate a new warranty period. The warranty period for installed replacement parts ends with the warranty period of the device as a whole.

### 3 Warranty procedure

- a) If defects appear during the warranty period, the warranty claims must be made immediately, at the latest within a period of 7 days.
- b) In the case of any externally visible damage arising from transport (e.g. damage to the housing), the person carrying out the transportation and the sender should be informed immediately. On discovery of damage which is not externally visible, the transport company and the sender are to be immediately informed in writing, at the latest within 3 days of delivery.
- c) Transport to and from the location where the warranty claim is accepted and/or the repaired device is exchanged, is at the purchaser's own risk and cost.
- d) Warranty claims are only valid if a copy of the original purchase receipt is returned with the device. devolo reserves the right to require the submission of the original purchase receipt.

### 4 Suspension of the warranty

All warranty claims will be deemed invalid

- a) if the label with the serial number has been removed from the device,
- b) if the device is damaged or destroyed as a result of acts of nature or by environmental influences (moisture, electric shock, dust, etc.),
- c) if the device was stored or operated under conditions not in compliance with the technical specifications,
- d) if the damage occurred due to incorrect handling, especially to non-observance of the system description and the operating instructions,
- e) if the device was opened, repaired or modified by persons not contracted by devolo,
- f) if the device shows any kind of mechanical damage, or
- g) if the warranty claim has not been reported in accordance with 3a) or 3b).

## 5 Operating mistakes

If it becomes apparent that the reported malfunction of the device has been caused by unsuitable hardware, software, installation or operation, devolo reserves the right to charge the purchaser for the resulting testing costs.

## 6 Additional regulations

- a) The above conditions define the complete scope of devolo's legal liability.
- b) The warranty gives no entitlement to additional claims, such as any refund in full or in part. Compensation claims, regardless of the legal basis, are excluded. This does not apply if e.g. injury to persons or damage to private property are specifically covered by the product liability law, or in cases of intentional act or culpable negligence.
- c) Claims for compensation of lost profits, indirect or consequential detriments, are excluded.
- d) devolo is not liable for lost data or retrieval of lost data in cases of slight and ordinary negligence.
- e) In the case that the intentional or culpable negligence of devolo employees has caused a loss of data, devolo will be liable for those costs typical to the recovery of data where periodic security data back-ups have been made.
- f) The warranty is valid only for the first purchaser and is not transferable.
- g) The court of jurisdiction is located in Aachen, Germany in the case that the purchaser is a merchant. If the purchaser does not have a court of jurisdiction in the Federal Republic of Germany or if he moves his domicile out of Germany after conclusion of the contract, devolo's court of jurisdiction applies. This is also applicable if the purchaser's domicile is not known at the time of institution of proceedings.
- h) The law of the Federal Republic of Germany is applicable. The UN commercial law does not apply to dealings between devolo and the purchaser.

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